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17. ABSTRACT (MAX. 250 WORDS)

Characteristics of pupils in poverty areas include low achievement, unpredictable and unorganized behavior, and little parent motivation. The poverty child needs to have his mathematical potential developed to cope with a scientific world. The School Mathematics Study Group furnishes experience and information about the education of middle group students which may have significance for the mathematical education of the poverty child. Suggestions to stimulate programs for the education of the poverty child include establishment of community committees on mathematics education for the poverty child, establishment of centers for the study of his needs, investigation of effective methods of teaching the poverty child, establishment of local committees to locate promising practices for improving his education, cooperation between the local college and the community in a pilot study project on teaching the poverty child, study of the effectiveness of the use of teacher assistants in classes of these children, study of means of communicating with parents of the low economic group, provision of part-time education with work experience for the poverty child, and establishment of summer camps to provide recreational activities.

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COMMUNITY ACTION PROGRAMS FOR IMPROVING MATHEMATICS EDUCATION OF PUPILS IN POVERTY AREAS by Kenneth E. Brown

1. Characteristics of Pupils in Poverty Areas

Pupils are different. This statement not only applies to the poverty area pupils as a group, but also to the individual pupils within the group. It is difficult if not impossible for the college-educated, middle-class oriented teacher to understand the deprivation of educational experience which the poverty child has faced from birth. He has both a meager comprehension vocabulary as well as an inadequate speaking vocabulary. As an elementary school pupil he is unable to apply abstract numbers to physical objects because of his lack of experience with manipulation of objects of the physical world. He has had few toys and possessions to play with, to collect, and to classify. In many cases his space orientation is not secure since his family has no strong geographic roots. The poverty child sees objects, people, houses, in a passive way. They are objects over which he has no control. Without the active involvement of his senses in the physical world he does not understand its properties. The physical world becomes a mystery that overwhelms him since he cannot control it, he does not understand what it can do for him or how he can create with it.

(a) Low Achievement

In general the poverty child is low in mathematics achievement. Frequently a teacher will find a poverty child that seems to stand out in the group. At first he may appear to be a genius. However, it will soon be seen that he is a genius only as a moron among idiots appears to be a genius.

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It should not be assumed that low achievement always mean low capacity for learning. A low socio-economic family status may have caused retardation before going to school. After school age the child may not have had the opportunity to develop educationally either in school or out of school. For whatever the reason may be, the poverty child is usually one of low achievement.

(b) Random Behavior

A study of a housing development in a poor area of a large city showed that the tenants had a tendency to random-like behavior. The behavior lacked pattern and predictability. In a mathematics classroom there is organization--the very opposity of randomness. Organization is contrary to the home experience of the poverty child. There is no organization in many homes--individuals eat when they wish, they come and go at unpredictable times. This random life is in conflict with the organized life in a mathematics class.

What causes man to seek an organized life? It is the hope for a better life. It is the hope that planning and organizing will result in a better tomorrow. When hope does not exist his behavior is random--unorganized. What gives man hope? It is education. Through education he perceives culture, achievement, and security.

What causes man to seek an education? He desires an organized life from which attainment of the middle class goals seems to come.

Thus the low achiever does not seek an education because he does not have nor wish to have an organized life. He does not have an organized life because he has no hope. He has no hope because he lacks the education.

There exists the cycle: "no education, no organized life, no hope; no education, no organized life, no hope." To break this cycle will require the combined efforts of many agencies in society.

(c) Need for Parent Motivation

The parent consciously or unconsciously reflects his values of education. If he believes that mathematics is important in our technological society, his attitude will help motivate the child to seek mathematical knowledge. If the parent, because of his lack of knowledge of mathematics, sees no value of the subject his actions will discourage the child from pursuing the science. Ways must be found to communicate to the parents the importance of mathematics for his child.

Since the poverty child will have many demands on his time, such as, caring for younger children, looking for chances to make that important "extra" dollar and helping a working mother, he must be encouraged to "do his homework". He is not likely to have a quiet room in which to study. A home library is usually non-existent. To partially make up for the lack of desirable physical equipment the parent must provide a highly motivating climate. This atmosphere is usually missing in the environment of the poverty child.

2. Society Needs the Poverty Child

Whether we like it or not, we have suddenly found ourselves in a world which revolves around science, and science in turn rests on mathematics. During the next 35 years we can expect the population of the United States to double. If this surge of population growth is accompanied by a continuing increase in living

standards there will be many technological changes. For example, air and water pollution, medical care, food production, and education facilities will claim more attention. In these areas assistance will come mainly from people who have a substantial understanding of basic scientific and mathematical principles.

If our nation is to hold its place as a world leader it must develop to a maximum all of its manpower. In addition to the need for highly trained mathematicians and engineers, there is and will be a need for persons with other special skills. Thousands of persons are now needed in the service trades, and the prospect is for an even greater demand in the years ahead. Between 1948 and 1962, professional and technical workers increased in industry 85 percent and in the government 106 percent. Are the youth educated to fill these positions?

Each week thousands of our youth leave school to join the human herd that treads the street looking for work. But there is no work for unskilled hands and minds. Many thousands of our high school graduates from poverty areas are among the low achievers who are unemployable. This group has been referred to as "social dynamite," "the terrible waste," and "the most dangerous social condition in America today." This is the group that must be educated; they must have their mathematical potential developed.

3. <u>There is Gold in the Poverty Hills</u>

During 1950-1960 the percent of professional and technical workers in the U.S. has increased more than 40 percent while during the same period the number of farm labors has decreased a similar percentage. This trend in increase in professional and technical workers is expected to continue.

Many of the academic low achievers from mountains of poverty can be transformed into academic gems. There may not be many potential mathematicians or scientists in the poverty group; however, there are many potential technicians. The technician or skilled workmen is a very important part of the Nation's needed manpower.

A study of the ratio of technicians to scientists at one highly developed research center showed that the ratio was 4 to 1. Our national progress may be slowed down by the lack of technicians to support our scientists while potential technicians lie undeveloped in hills of poverty. All recent studies show clearly that our youth can learn more mathematics and science than that we have assumed. Even children in the lower grades, in recent experiments, have successfully mastered mathematics normally taught to high school youth. In many cases, the poverty child can be developed for important positions in our highly technical society.

4. Previous Programs

Many teachers and authors have realized that the school mathematics for the low achiever should be improved. Authors have included novel and motivating materials in new textbooks. Teachers have tried many different methods of instruction; however, there has not been a national team effort to attack the unsolved problem.

Two large national writing projects, the School Mathematics Study Group (SMSG) and the NCTM projects, are furnishing valuable experience and information about the education of the so-called middle-group students which may have significance for the mathematical education of the poverty child.

1. SMSG has published a two-volume text, Introduction to Secondary School Mathematics, for use in grades seven and eight with students in the 25th to 75th percentile range in learning ability. Introduction to Algebra is also a SMSG two-volume, 2-year course for use with ninth

and tenth grade students in the same middle-ability range. These texts differ from usual textbooks in that the study units are shorter, concrete examples are used to introduce new concepts, the reading level is lower, and discovery techniques are used to evoke student participation in the development of ideas. These texts are being widely used and evaluated by classroom teachers.

2. NCTM has published a two-part text, Experiences in Mathematical Discovery, written for students in the 25th to 50th percentile range of mathematics achievement. Exposition is held to a minimum, and emphasis is placed on student discovery of principles in the broad areas of number, operation, measurement, theory of space, function and relation, proof, symbolic representation, and probability. Revision will follow evaluation and experimental use of these materials.

PROPOSALS FOR ACTION

Modern society is able to support human life from the hottest deserts of the world to the frigid climates of the Poles, yet is unable to provide adequately for thousands of youth. We have explored the depths of the oceans and the mysteries of outer space. Yet we know little of why the low achiever doesn't learn. We know the language of the dolphin but we cannot communicate with and educate the lower 30 percent of our own species. The task of educating the poverty child is beyond the power of any one agency. Certainly the school cannot assume the task alone. Effective education of the poverty child will require the combined efforts of many agencies in society. The pupil must have hope of a job, the school must prepare him for the job, industry must provide the job, the community must accept him in order to give him the security and respect that will

generate the desire for more education. Perhaps the following suggestions will stimulate action programs that will fit the needs of the community.

1. Establish a Community Committee on Mathematics Education for the Poverty Child.

   This Committee should be the result of the cooperation of many groups; such as, parents, teachers, mathematicians, administrators, and representatives from industry, labor, professional organizations and local government agencies. The committee could establish goals in mathematics education for the poverty child and plan ways of reaching these goals. The Committee could help establish and improve lines of communication between the school and local groups.

2. Establish Centers for the study of the Poverty Child

   The local school and college could develop a pilot research project on the needs of the poverty child and better ways to meet these needs. The centers could emphasize experimentation and/or demonstration. The master teachers could write material and try it out with the low achievers in the center. Psychologists in the centers could study effective learning procedures. The results of the experimentation and controlled instruction could be publicized through publications and through demonstrations at the center. Some centers might include dormitories for students from rural areas.

3. Investigate Methods of Teaching the Poverty Child

   Effective methods of teaching various groups of poverty children should be studied in research and demonstration centers with the aid of competent psychologists. The mathematical concepts and skills that are best suited for instruction by certain methods and with certain aids should be determined for each type of child.

Experimentation should be made with a variety of aids such as television, films, and programmed learning materials.

4. Establish a Local Committee to Locate Promising Practices for Improving the Education of the Poverty Child.

   Information might be gathered through a questionnaire and through such national organizations as the National Council of Teachers of Mathematics, the Association of State Supervisors of Mathematics and National Association of Secondary School Principals. With the assistance of a grant from local industry, members of the Committee could visit the more promising communities.

5. The Local College and Local Community Could Cooperate in a Pilot Project on Teaching the Poverty Child.

   The local college staff could work directly with the local school in trying new methods and teaching aids for the poverty child.

6. Study the Effectiveness of the use of Teacher Assistants in Classes of Children from the Low Income Group.

   The local community could finance a pilot project in which non-professional assistants worked with teachers in giving special help to the poverty child.

7. Study Means of Communicating with Parents in the Low Economic Group.

   It is difficult to get parents of the poverty child to attend parent-teacher meetings. Are there other ways of communicating with them? Representatives of the school and business should study ways of getting the parents of these children to take a more active part in the school.

8. Study Ways of Providing Part-Time Education with Work for the Poverty Child

The poverty child must understand that education is important for him. A job in which education is used will give him hope. This hope will motivate him to continue his education. Also the work will provide the money to give him self respect. He can then see that money can come from a desirable job as well as a "racket."

9. Establish Summer Camps for the Poverty Child

Students from slums could be placed in the organized environment of a summer camp. It should not be just a work camp. It should be in a highly organized educational setting. In addition to the study of academic subjects emphasis should be placed on cultural, recreational activities such as, music, plays, and art.